

WE CLAIM:

1. An exhaust system for an internal combustion engine, comprising:  
a catalytic converter unit;  
a bushing element provided in a shell wall of said catalytic  
5 converter unit; and  
an oxygen sensor positioned within exhaust flow of the catalytic converter unit and extending through said bushing element and having a connector disposed in intimate contact with said bushing element.
2. The exhaust system of Claim 1 wherein said oxygen sensor is positioned within said catalytic converter unit at an angle less than 90 degrees to the centerline of the exhaust flow within said catalytic converter unit.
3. The exhaust system of Claim 2 wherein said oxygen sensor is positioned within said catalytic converter unit extending through a bushing element in an endcone of said catalytic converter.
4. The exhaust system of Claim 1 wherein the shell wall of the catalytic converter unit includes an insulated wall construction having an inner wall spaced from an outer wall, and said bushing forms a sealed connection between said inner and outer walls.
5. The exhaust system of Claim 1, wherein said bushing has threads disposed through the shell wall such that said connector threads into said bushing to dispose at least a portion of said oxygen sensor within said exhaust flow.

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6. The exhaust system of Claim 5, wherein said bushing further comprises a substantially flat surface which intimately contacts at least a portion of said connector to form a gas tight seal between said oxygen sensor and said exhaust flow.

7. The exhaust system of Claim 5, further comprising a gasket disposed in intimate contact with said bushing element and said oxygen sensor.

8. The exhaust system of Claim 1 wherein said bushing element is an integral bushing formed through the shell wall of said catalytic converter.

9. An exhaust system for an internal combustion engine, comprising:

- a catalytic converter component;
- an integral bushing forming a sealed connection between inner and outer walls of a catalytic converter shell; and
- 5 an oxygen sensor positioned within exhaust flow of the catalytic converter unit and extending through said integral bushing and having a connector disposed in intimate contact with said integral bushing.

10. The exhaust system of Claim 9 wherein said oxygen sensor is positioned within said catalytic converter unit at an angle less than 90 degrees to the centerline of the exhaust flow within said catalytic converter unit.

11. The exhaust system of Claim 9 wherein said oxygen sensor is positioned within said catalytic converter unit extending through an integral bushing in an endcone of said catalytic converter.

12. The exhaust system as in Claim 9, wherein said bushing has threads disposed through the shell wall such that said connector threads into said bushing to dispose at least a portion of said oxygen sensor within said exhaust flow.

13. The exhaust system of Claim 12 wherein said bushing further comprises a substantially flat surface which intimately contacts at least a portion of said connector to form a gas tight seal between said oxygen sensor and said exhaust flow.

14. The exhaust system of Claim 8 wherein said bushing is formed by application of substantially constant pressure of a rotated bit against the catalytic converter shell wall to effect softening, penetration, and forming of the wall material.

15. The exhaust system of Claim 14 wherein said bushing is threaded.

16. A method for positioning an oxygen sensor within an exhaust system, comprising:

providing a bushing in an endcone of a catalytic converter to create a connection between outer and inner walls of said endcone; and,

5 disposing an oxygen sensor through said bushing to extend into exhaust gases flowing through the exhaust system.

17. The method of Claim 16 for positioning an oxygen sensor within an exhaust system, comprising:

contacting an outer wall of the catalytic converter component

with a rotated bit;

5 softening the material of the catalytic converter component where said rotated bit contacts the wall of the component;

penetrating the softened material with said rotated bit to form a bushing; and

mounting an oxygen sensor within the bushing.

18. The method of Claim 16 for positioning an oxygen sensor within an exhaust system, comprising:

contacting an inner wall of the catalytic converter component

5 with a rotated bit;

softening the material of the catalytic converter component where said rotated bit contacts the inner wall of the component; and,

penetrating the softened material with said rotated bit to form a bushing.

19. The method of claim 16 wherein penetration of the softened material is effected by application of substantially constant pressure of said rotated bit against the wall of the catalytic converter component.

20. The method of claim 18 wherein the bit comprises a collar surface which contacts and flattens the softened material of the catalytic converter component.

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